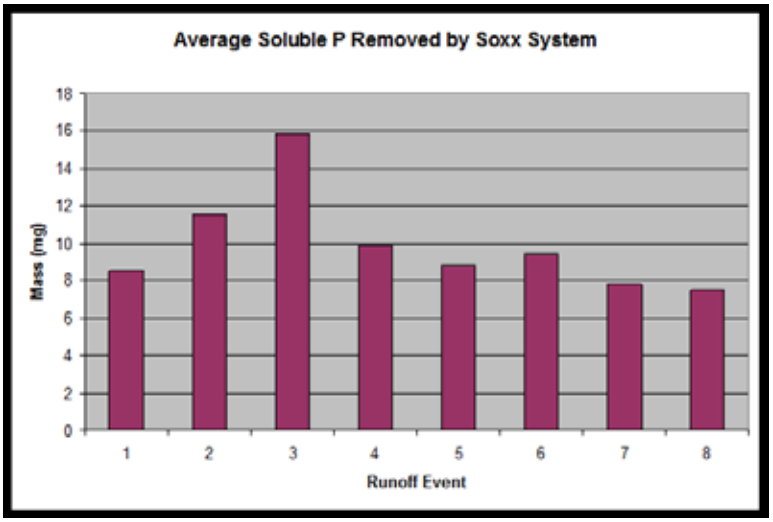
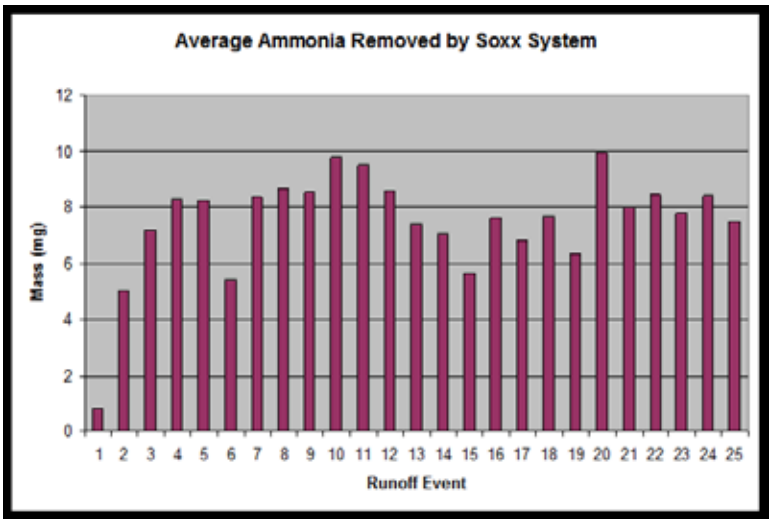
filtrexx®
SUSTAINABLE TECHNOLOGIES

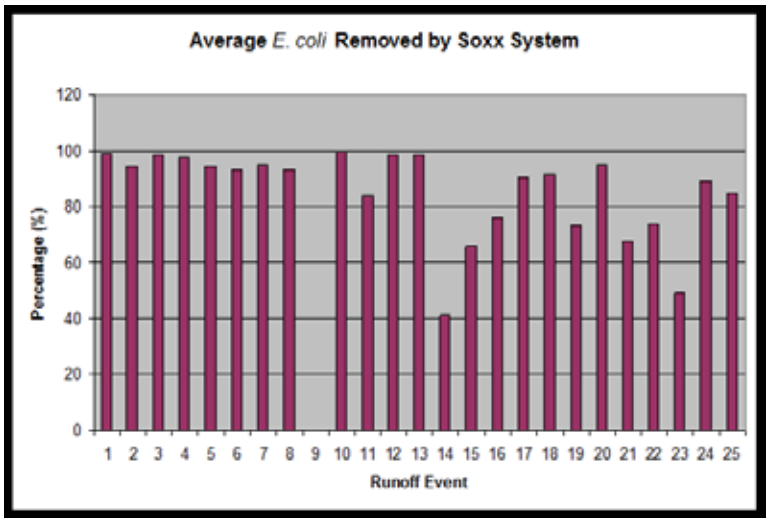
TechLink Research Summary #3328

Performance Capacity of Filtrexx® Treatment Train™ Products in Urban Runoff Applications

Urban storm water runoff poses a substantial threat to receiving surface waters. According to the US Environmental Protection Agency's (USEPA) national water quality assessment, 35% of US streams are severely impaired and 75% of the population lives within 10 miles of an impaired surface water (USEPA 2007). In accordance with Section 303(d) of the Clean Water Act, the USEPA designates specific stream segments for Total Maximum Daily Load (TMDL) development for particular pollutants. Between 1995 and 2007, bacterial pathogens and nutrients have been leading causes of TMDL designations, with 5081 and 3511 listings, respectively. These pollutants are the number one (8,913 cases) and fifth (5,625 cases) leading causes of impaired water quality in the US (USEPA 2007). Urban storm water runoff is one of the leading sources of these pollutants. Green infrastructure, low impact development, green building ordinances, NPDES storm water permit compliance, and TMDL implementation strategies have become national priorities. However, designers need more sustainable, low cost solutions to meet these goals and guidelines. The purpose of the study was to determine the storm water pollutant removal efficiency and longevity of FilterSoxx™ with a natural Filtrexx® Treatment Train™ Product (FTTP) added to the FilterSoxx™ system. Urban storm water pollutants evaluated included: ammonium-nitrogen, nitrate-nitrogen, oil, soluble phosphorus, and E. coli bacteria. The FTTP was exposed to pollutant concentrations representative of urban storm water runoff, for up to 25 runoff events.





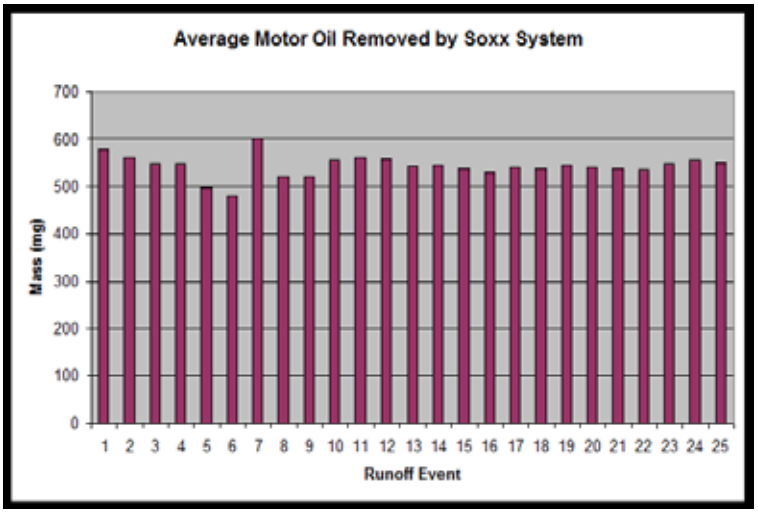


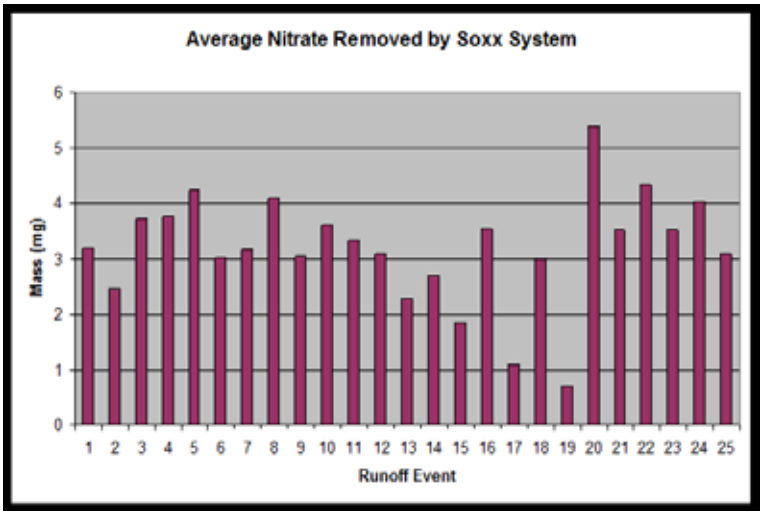
Summary of Results

For soluble phosphorus, the FilterSoxx-Treatment Train System (FS-TT) removed a total of 72 mg/linear ft over 8 runoff events, or an average of 34%; 54% of ammonium-N over 25 runoff events, or 162 mg/linear ft, and only 11% of nitrate-N, or 69 mg/linear ft. The FS-TT removed 99% of oil over 25 runoff events, or a total load of 11,662 mg/linear ft; and 85% of E. coli and a total load of 9.52 CFUs x 107/linear ft over the same number of storm events. These load capacities can be used to determine the annual load removal efficiencies for site specific applications where total pollutant load exposure from a drainage or watershed area (e.g parking lot or field) has been determined. For example, if a 1 acre asphalt parking lot generates 10,000 mg of ammonium-N on an annual basis, approximately 63 ft of FS-TT would be needed to treat the ammonium-N coming from the parking lot.

Based on these results it is clear this technology can be used to remove a variety of storm water pollutants and perform at a high level over multiple storm events, thereby improving storm water quality and potential receiving surface waters over a long period of time.

Once the product's filtering capacity is reached it can be easily removed, returned to a composting facility for recycling, and replaced with a new one. Furthermore, for oil and bacteria this technology may be used in more challenging applications where load exposure is much greater, such as oil spills and runoff from animal feeding operations. Additionally, this technology should be useful in other green infrastructure applications, such as bioretention systems and bioswales.





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